CLAIMS

What is claimed is:

1. A switch assembly, comprising:

an arm assembly configured to rotate between at least a first rotational position and a second rotational position,

a primary spring coupled to the arm assembly and configured to bias the arm assembly toward a third rotational position that is located between the first and second rotational positions;

one or more secondary spring disposed in the switch assembly, each secondary spring configured to selectively bias the arm assembly toward the third rotational position when the arm assembly reaches a predetermined rotational distance from either the first or second rotational positions; and

a latch assembly disposed in the switch assembly and operable to (i) selectively hold the arm assembly in either the first or second rotational positions and (ii) selectively release the arm assembly from the rotational position in which it is holding the arm assembly.

2. The switch assembly of Claim 1, further comprising:

one or more additional secondary springs disposed in the switch assembly, each additional secondary spring adapted to selectively bias the arm assembly toward the third rotational position when the arm assembly reaches a predetermined rotational distance from either the first or second rotational positions that is different from the predetermined rotational distance of the other secondary springs.

3. The switch assembly of Claim 1, further comprising:

a shaft assembly coupled to the arm assembly and to the primary spring, whereby the arm assembly is configured to rotate.

4. The switch assembly of Claim 3, wherein the shaft assembly and primary spring are integrally formed.

5. The switch assembly of Claim 4, wherein the shaft assembly comprises a torsion bar spring.

6. The switch assembly of Claim 1, wherein the arm assembly comprises:

a rotor adapted to be rotationally mounted and configured to rotate between at least the first and second rotational positions; and

an arm coupled to the rotor and extending axially therefrom.

7. The switch assembly of Claim 6, wherein:

the latch assembly comprises:

a first stator assembly including two or more pole pieces, and

a second stator assembly including two or more pole pieces;

and

the rotor is disposed between the first and second stator and comprises:

two or more rotor magnets coupled thereto and positioned such that, in the first and second rotational positions, each rotor magnet forms a magnetic circuit with one of the first stator poles and one of the second stator poles.

8. The switch assembly of Claim 7, wherein each of the secondary springs is coupled to one of the rotor magnets.

9. The switch assembly of Claim 7, wherein each of the secondary springs is coupled to one of the first stator assembly poles or to one of the second stator assembly poles.

10. The switch assembly of Claim 7, wherein the latch assembly further comprises:

a coil disposed proximate at least one of the first and second stator assemblies, the coil adapted to receive an electrical signal, whereby a magnetic field is generated.

11. The switch assembly of Claim 1, wherein:

the primary spring and one or more of the secondary springs each cause the arm to rotate toward the second rotational position when the latch assembly releases the arm assembly from the first position; and

the primary and one or more of the secondary springs each cause the arm to rotate toward the first rotational position when the latch assembly releases the arm assembly from the second rotational position.

12. The switch assembly of Claim 1, wherein each secondary spring no longer biases the arm assembly when:

(1) the arm subsequently moves in a direction opposite to that which it was moving when each secondary spring biased the arm assembly; and

(2) the arm assembly is substantially at the predetermined rotation distance.

13. The switch assembly of Claim 1, wherein each secondary spring is configured to selectively engage and disengage the arm assembly.

14. The switch assembly of Claim 1, wherein each secondary spring is coupled to the arm assembly and configured to selectively engage and disengage the latch assembly.

15. A switch assembly, comprising:

a rotor configured to rotate between at least a first rotational position and a second rotational position; and

an arm coupled to the rotor and extending axially therefrom;

a primary spring coupled to the rotor and configured to bias the rotor toward a third rotational position that is located between the first and second rotational positions;

one or more secondary spring disposed in the switch assembly, each secondary spring configured to selectively bias the rotor toward the third rotational position when the rotor reaches a predetermined rotational distance from either the first or second rotational positions; and

a latch assembly disposed in the switch assembly and operable to (i) selectively hold the arm assembly in either the first or second rotational positions and (ii) selectively release the arm assembly from the rotational position in which it is holding the arm assembly.

16. The switch assembly of Claim 15, further comprising:

one or more additional secondary springs disposed in the switch assembly, each additional secondary spring adapted to selectively bias the rotor toward the third rotational position when the rotor reaches a predetermined rotational distance from either the first or second rotational positions that is different from the predetermined rotational distance of the other secondary springs.

17. The switch assembly of Claim 15, further comprising:

a shaft assembly coupled to the rotor and to the primary spring, whereby the rotor is configured to rotate.

18. The switch assembly of Claim 17, wherein the shaft assembly and the primary spring are integrally formed.

19. The switch assembly of Claim 18, wherein the shaft assembly comprises a torsion bar spring.

20. The switch assembly of Claim 15, wherein:

the latch assembly comprises:

a first stator assembly including two or more pole pieces, and

a second stator assembly including two or more pole pieces;

and

the rotor is disposed between the first and second stator and comprises:

two or more rotor magnets coupled thereto and positioned such that, in the first and second rotational positions, each rotor magnet forms a magnetic circuit with one of the first stator poles and one of the second stator poles.

21. The switch assembly of Claim 20, wherein each of the secondary springs is coupled to one of the rotor magnets.

22. The switch assembly of Claim 20, wherein each of the secondary springs is coupled to one of the first stator assembly poles or to one of the second stator assembly poles.

23. The switch assembly of Claim 20, wherein the latch assembly further comprises:

a coil disposed proximate at least one of the first and second stator assemblies, the coil adapted to receive an electrical signal, whereby a magnetic field is generated.

24. The switch assembly of Claim 15, wherein:

the primary spring and one or more of the secondary springs each cause the arm to rotate toward the second rotational position when the latch assembly releases the arm assembly from the first position; and

the primary and one or more of the secondary springs each cause the arm to rotate toward the first rotational position when the latch assembly releases the arm assembly from the second rotational position.

25. The switch assembly of Claim 15, wherein each secondary spring no longer biases the arm assembly when:

(1) the arm subsequently moves in a direction opposite to that which it was moving when each secondary spring biased the arm assembly; and

(2) the arm assembly is substantially at the predetermined rotation distance.

26. The switch assembly of Claim 15, wherein each secondary spring is configured to selectively engage and disengage the rotor.

27. The switch assembly of Claim 15, wherein each secondary spring is coupled to the rotor and configured to selectively engage and disengage the latch assembly.